type is a large ruminant, referred by the author to the *Giraffidæ*, and stated to connect *Helladotherium* and the giraffe with some of the aberrant antelopes of Pikermi. Finally, a large ostrich is especially noteworthy from a distributional point of view, since we now have remains of this genus from Samos, the Thracian Chersonese, and Northern India.

NOTES.

WE regret to have to record the death of the eminent American physicist, Prof. Elias Loomis. He was born at Wellington, Connecticut, in 1811, and was educated at Yale College, where he acted for some time as tutor. He was successively Professor of Mathematics and Natural Philosophy in Western Reserve College, Ohio; Professor of Natural Philosophy in the University of the City of New York; and Professor of Natural Philosophy and Astronomy in Yale College. The latter appointment he received in 1860, and he held it until his death. Prof. Loomis was the author of more than 100 scientific treatises. Among his works was a series of text-books on mathematics, natural philosophy, astronomy, and meteorology. Of this series more than 500,000 copies were sold. During the last twenty-five years of his life he devoted himself chiefly to original research, and gave much time and energy to the preparation of a full account of the principles of meteorology. He was a member of various American and European scientific Societies.

ON August 19 the fiftieth anniversary of the foundation of the Observatory at Pulkowa was celebrated. Among those present on the occasion were the President of the St. Petersburg Academy of Science, the Grand Duke Constantine Constantinovitch, the Russian Ministers and Court dignitaries, the German and French Ambassadors at the Russian Court, and deputations from the Universities and Academies of Russia, and from foreign observatories, including Greenwich and the chief German observatories. Numerous congratulatory telegrams were received. The Czar expressed in a telegram high appreciation of the scientific merits of the Observatory.

THIS week the meeting of the Photographic Convention of the United Kingdom is being held in London. It was opened on Monday in St. James's Hall, where an interesting collection of photographic appliances and specimens of the best photographic work had been brought together. In his inaugural address, Mr. Andrew Pringle, the President, reminded his hearers that the present year was the fiftieth of practical photography, and traced the history of the art from its birth to its jubilee.

AT the meeting of the Linnean Society of New South Wales on June 26, Dr. Oscar Katz read a paper giving an account of experimental researches with the microbes of chicken-cholera. In this paper the author describes the investigations undertaken by him since last year with regard to the microbes of chicken-cholera. The larger portion of the experiments were made on wild rabbits; in addition, the action of the microbes on domestic poultry, as well as on indigenous birds, on hares, guinea-pigs, and ferrets was studied. A number of other points in the life-history of the chicken-cholera bacteria are dealt with in the paper: for instance, their behaviour when transmitted through the bodies of rabbits in successive generations; towards desiccation, putrefaction, &c. Rabbits were repeatedly protected against a virulent infection, in consequence of having previously partaken, at intervals, of cultures of the microbes in which the latter had been killed by moderate heat.

ON August 17, at 1 o'clock a.m., a severe earthquake shock of an undulatory character, lasting six seconds, was felt at Jablanica, Bosnia. The direction of the seismic wave was from south-east to north-west. According to a telegram from Mostar, a shock, lasting ten seconds, was felt there also on August 17. Some damage was caused to the railway line between Mostar and Ostrojac, while at Konjica a wall collapsed. The duration of the shock at the latter town was only five seconds.

THE Pilot Chart of the North Atlantic Ocean for the month of August shows that fine weather prevailed generally over the greater part of the North Atlantic during July. The only storms worthy of notice were two which prevailed in the western part of that ocean; the first was situated in latitude 40° N., longitude 58° W., on the 10th, and moved across Newfoundland on the 16th; the next day it was joined by the second storm, which passed out to sea from the coast of New Jersey on the 15th. The storm then travelled about north-north-east, and disappeared off the south coast of Greenland. Much fog has been experienced along the Transatlantic routes, and icebergs have been numerous, within the usual limits.

THE Report of the Meteorological Commission of the Cape of Good Hope for the year 1888 contains monthly summaries and results for 38 stations and rainfall statistics at 292 stations, including returns from Basutoland, Orange Free State, &c. In addition to the tables, there are some extremely interesting diagrams showing the actual rainfall in 1888 at a number of stations throughout the colony, as compared with the average rainfall. They show that in nearly all months the fall in 1888 was much above the average. Storm warnings are not yet issued, but weather telegrams are received from a number of stations, and after correction and collation, reports are sent to coast stations and entered on charts, for the information of seamen and others.

VOLS. IX. AND X. of *Aus dem Archiv der Deutschen Seewarte* contain reports of the activity of that institution during the years 1886 and 1887. The collection of observations at sea, and at distant stations, has been carried on with vigour, while weather telegraphy and the verification of chronometers and nautical instruments also receive great attention. Dr. Neumayer regrets that the ever-increasing routine work curtails the time for scientific investigation, yet the volumes contain many valuable researches by members of the staff, to some of which we can only very briefly refer, although all are worthy of careful study. In vol. ix. Dr. van Bebber, dealing with typical weather-conditions, investigates the passage of barometric depressions over Europe during the years 1881–85, in continuation of a former paper referring to 1876–80. The object of the discussion is to trace the influence of the depressions upon the weather, with a view to the discovery of the laws of the changes of direction of their tracks, and of their rates of progression. The author shows that the depressions move along certain tracks with greater velocity than the motion of minima generally. The text is illustrated by twenty plates. The other articles are: on the determination of the refraction constants; and remarks from ships' logs relating to weather, &c., in Eastern Asiatic waters. In vol. x. Dr. Köppen contributes a useful paper on the determination of air-temperature. The author investigates the influence of radiation on different thermometers and screens, and gives a *résumé* of the experiments with regard to the latter in various countries, and of the observations on local differences of temperature (including the influence of radiation). These experiments seem to show that screens through which the air can freely pass are better than large shelters, and that the effect of radiation is lessened by the free circulation of the air, and by the smallness of the thermometer-bulbs. M. Möller contributes an article on the circulation of the atmosphere between the equator and the Poles. The results arrived at differ from those of Prof. Ferrel, especially with regard to the force of westerly winds in latitude, 38°, in the lower and upper strata. The volume concludes with an article on Combe's apparatus for testing chronometers.

FROM the statistics of the Education Department in India during the past year, it appears that the percentage of those of school-going age who actually attended was 11·8 as compared with 10·7 the preceding year. The total attendance increased about 120,000 on the preceding year, but the numbers at the training-schools fell from 5716 to 4761. Year by year the Mahometan pupils have increased, and during the past year their numbers were 804, 485 as against 752,441 in 1886-87. The total expenditure on education has increased from 2,52,41,414 rupees in 1886-87 to 2,61,91,280 rupees in 1887-88; but the indirect expenses—that is, the cost of inspection, buildings, scholarships, &c.—fell from 54,11,098 rupees in 1886-87 to 52,81,471 in 1887-88. The fees increased from 65,29,958 rupees to 72,94,023 rupees. Except in the circumstance that the numbers attending the training-schools have declined very much, the Government thinks that everywhere marks of great progress are shown. The expenditure by local bodies on education has also increased from 37,14,579 rupees in 1886-87 to 46,41,551 rupees in 1887-88.

A SWEDISH paper gives an account of some experiments made by Captain R. von Mühlenfels in Carlskrona in storing live fish, his object being to discover the maximum degree of confinement they could bear without deteriorating in quality. With this aim he placed 1300 kilogrammes of live cod in a cask, covered within and without with asphalt tar, and of about 52 cubic metres in content. The cask was firmly fixed in a stream of fresh running water. During the first few weeks of their confinement the fish grew thinner, and had deteriorated in quality. At the end of six weeks, however, it was found that those which remained had much improved by their captivity.

THE French *Journal Officiel* recently contained a report which Prof. Edmond Perrier had sent in to the French Government on the subject of the best means of protecting fishermen against porpoises. Although the depredations of these creatures have been exaggerated, it is certain that they do considerable damage, especially on the Mediterranean coasts of France, by tearing the nets. For at least a quarter of a century past, efforts have been made to lessen the numbers of the porpoises by offering a reward per head, and by other remedies. In 1865 the Government invited the fishermen themselves to organize a seine-net fishery for porpoises, and they were offered special nets, and sums of from 5 to 25 francs for each animal. It was, however, found in practice that as soon as the porpoises felt themselves to be surrounded, they simply jumped over the seine-nets and were at large again. Some years later the fishermen of Cannes, Saint Tropey, and La Ciotat petitioned Government to lend them a gun-boat, filled with torpedoes, for the purpose of firing at the porpoises. This was done, and the cannon and the torpedoes scared away the porpoises for about eight days, but they scared away the fish as well, so that there was no fishing for at least a week. The porpoises, moreover, are too numerous and too agile to be shot, one by one, in an effective manner. The report sums up that the employment of artillery against porpoises is perfectly useless, that a reward for killing them singly is equally unavailing, and that the only thing to do is to encourage the fishermen to unite in chasing the porpoises, and in forming a mutual insurance guarantee against their depredations. In the meantime the Department of the Marine might continue to indemnify, to a certain extent, the proprietors of any nets that have been very seriously injured.

A FRUITFUL study may be made of the sociology of small sections of a community. M. Dumont finds in the rural communes of France much individuality as regards density, wealth, mobility, birth, marriage, and death rates, &c. We will give a few facts from his interesting paper (*Rev. Scient.*). Unlike what usually occurs near large towns, the eleven rural communes in the outskirts of Caen are with one exception (Mondeville) being depopulated. Great mobility in the rural populations is generally associated with a low birth rate, great fixity with a high one. Examples of a low birth rate occur in the communes near Caen (13 to 17); on the other hand, the natality is high in some of the poor and miserable communes of the Côtes-du-Nord (40 to 41). Side by side in the same department, and even the same canton, are very different birth rates. For the nine communes of Paimpol (Côtes-du-Nord), some 20,000 inhabitants, the rate varies from 20 to over 30. In Bretagne, with a generally high birth rate, there are isolated communes with a very low one; and two communes are cited, which are apparently much alike, and where subsistence is drawn from the sea, but the birth rate of one is 35·1, that of the other 21·7. In the canton of Isigny (Calvados) the birth rate was in general steadily low throughout the century till ten or twenty years ago, when there was a remarkable rise. The marriage rate in Ile-de-Ré is considerably above the average for France, while the fecundity of marriage has of late been going down. But one commune, the small town of Saint Martin, shows a recent decline of its marriage rate (25 per cent. in three decades) while the constancy of its low birth rate points to an increased fecundity of marriage. The death rate in many communes (those of Douvres, *e.g.*) is now much greater than early in the century. The increase of illegitimacy and high mortality of infants are often obviously the cause of a rising death rate.

CONSIDERING the progress of biology, Dr. Düsing remarks (in a recent number of *Humboldt*) that for 25 years the effort of zoology has been mainly to determine the descent of animals by means of their morphological features. The flourishing of morphology has been favoured by the discovery of a large number of lower forms of animal life. But the time is not far off when it will become more and more difficult to discover new animals, and those known will have been efficiently described. Investigation will therefore be directed more to the mode of life, which, in the case of most animals, is but little known. This demands long observation and a special talent of observation, which is quite different from that required by morphology. Several investigators have entered this sphere, studying especially the higher animals; but most continue in the direction impressed on zoology by Darwin. The prevailing tendency is exemplified in the founding of a Professorship of Phylogeny at Jena. And it is a remarkable fact that the present occupant, Prof. A. Lang, is one of those who are leaving the older paths for biology, as shown by his recent work, which is entitled "On the influence of a fixed mode of life on animals, and on the origin of nonsexual propagation through fission and budding."

THE *Kew Bulletin* for August consists of a full account of the fluted scale-insect (*Icerya purchasi*, Maskell), which is described as one of the most destructive pests injurious to plants. Of late years it has made its appearance in South Africa, New Zealand, and California. The best account of the insect has been published by Prof. Riley, and the results of his inquiries are made easily accessible in the *Bulletin* to a wide circle of readers.

MR. WRAY, Curator of the Museum of Perak, in the Malay Peninsula, communicates to the *Perak Government Gazette* a note on the mango weevil, a pest which has lately excited some alarm in various parts of the East. Mr. Wray describes it as a small beetle infesting the mangoes in Perak, particularly the introduced varieties, which has been examined and found to be identical with the mango weevil of India, known to science as *Cryptorhynchus mangnifera* of Fabricius. It is a small dark rusty-grey insect about a quarter of an inch long, and, though it and its ravages have long been known, little or nothing has up to the present time been discovered of its habits. It is believed that it lays its eggs in the flower or very young fruit, for in the ripe fruit there is no external mark to show where it gained an entrance, and it is not until the perfect insect eats its way out of the mango that it is possible to tell whether any particular fruit is sound or diseased. Some varieties of the mango enjoy complete immunity from the attacks of this insect, and it has been noticed that even particular trees of varieties which are not so favoured always escape. This fact seems to hold out the hope that, by careful selection, good varieties of the fruit could be raised which would not be subject to the attacks of this destructive pest. The character which renders the fruit unsuitable as food for the weevil is, and probably always will remain, unknown, as our senses may not be keen enough to detect the particular taste or smell which prevents the female from laying her eggs in the fruit of the naturally protected trees.

DR. HENRY C. MCCOOK is about to issue an elaborate work on "American Spiders and their Spinning-work." It embraces studies extended over more than fifteen years, and will be printed in three volumes. Volumes I. and II. will contain the author's personal observations, studies, and illustrations of the habits and industry of spiders. The studies are particularly directed to the spinning habits of the great group of spiders known as orb-weavers; but these are expressed in their relations to all the other tribes in both hemispheres. Volume III. will contain the systematic part of the work, and embrace descriptions of the orb-weavers of the United States, illustrated by a number of lithographic plates, painted by hand in the colours of Nature. The volumes will be illustrated, wholly from Nature, the number of engravings in the first volume alone exceeding two hundred.

MESSRS. J. AND A. CHURCHILL hope to publish in September a work on "Fuel and its Applications," by Mr. E. J. Mills, F.R.S., and Mr. F. J. Rowan. It will be the first volume of a large work on chemical technology, of which Mr. C. E. Groves, F.R.S., will be the general editor, and which will be founded on one written by Richardson and Ronalds, familiarly known as "Knapp's Technology." Messrs. Mills and Rowan's work on fuel is in reality a new work, dealing with the applications of fuel to arts and manufactures as introduced by the most modern discoveries. The volume is profusely illustrated.

MESSRS. GEORGE PHILIP AND SON have published a new edition of Mr. T. Rhodes's useful "Steamship Guide and Holidays Afloat." The work has been thoroughly revised, and much new information is embodied in the present edition.

A WORK on "The Microscope in the Brewery and Malthouse," by C. G. Matthews and F. C. Lott, will be published early next month by Messrs. Bemrose and Sons.

A CALCUTTA firm has published a book entitled "The Game, Shore, and Water Birds of India," by Colonel A. Le Messurier, which is an attempt to describe the miscellaneous water-fowl of India. The author treats of the birds under three heads—namely, "Scratchers," "Waders," and "Swimmers,"—and, besides classifying them under these heads, he gives the native names of the birds in the various languages. There are in all 121 illustrations. The book might well be enlarged, particularly by the addition of a list of places where the various species may be found.

THE additions to the Zoological Society's Gardens during the past week include a Great-billed Touracou (*Corythaix macrorhyncha*) from West Africa, presented by Lady Charlotte Blandford Griffith; a Water Chevrotain (*Hyomoschus aquaticus*) from West Africa, a Blue and Yellow Macaw (*Ara ararauna*) from Brazil, deposited.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1889 *AUGUST* 25-31.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on August 25

Sun rises, 5h. 4m.; souths, 12h. 1m. 50·6s.; daily decrease of southing, 16·4s.; sets, 19h. 0m.: right asc. on meridian, 10h. 17·6m.; decl. 10° 37′ N. Sidereal Time at Sunset, 17h. 17m.

Moon (New on August 26, 14h.) rises, 3h. 21m.; souths, 11h. 16m.; sets, 18h. 59m.: right asc. on meridian, 9h. 32·0m.; decl. 18° 0′ N.

Planet.	Rises.	Souths.	Sets.	Right asc. and declination on meridian.	
	h. m.	h. m.	h. m.	h. m.	° ′
Mercury..	6 33 ..	13 3 ..	19 33 ...	11 18·5 ..	5 16 N.
Venus ...	1 20 ..	9 17 ..	17 14 ..	7 32·4 ..	20 35 N.
Mars ...	3 1 ...	10 43 ..	18 25 ...	8 58·2 ..	18 21 N.
Jupiter ...	15 43 ...	19 36 ...	23 29 ..	17 53·2 ...	23 25 S.
Saturn ...	4 16 ...	11 35 ...	18 54 ...	9 50·6 ...	14 19 N.
Uranus ...	9 28 ...	14 56 ...	20 24 ...	13 12·6 ...	7 4 S.
Neptune..	22 7*..	5 57 ...	13 47 ...	4 11·5 ..	19 26 N.

* Indicates that the rising is that of the preceding evening.

Aug.	h.	
25 ...	5 ...	Jupiter stationary.
25 ...	20 ...	Saturn in conjunction with and 2° 28 south of the Moon.
27 ...	22 ...	Mercury in conjunction with and 4° 42′ south of the Moon.

Variable Stars.

Star.	R.A.	Decl.			
	h. m.	° ′		h. m.	
Algol	3 1·0 ...	40 32 N. ...	Aug. 27,	21 10	*m*
δ Libræ	14 55·1 ...	8 5 S. ...	,, 29,	0 48	*m*
R Scorpii	16 11·0 ...	22 40 S. ...	,, 29,		*M*
S Scorpii	16 11·1 ...	22 37 S. ...	,, 31,		*M*
U Ophiuchi... ...	17 10·9 ...	1 20 N. ...	,, 28,	3 57	*m*
			,, 29,	0 5	*m*
X Sagittarii... ...	17 40·6 ..	27 47 S. ...	,, 26,	1 0	*M*
Y Sagittarii... ...	18 14·9 ...	18 55 S. ...	,, 28,	2 0	*M*
R Scuti	18 41·6 ...	5 50 S. ...	,, 29,		*m*
U Aquilæ	19 23·4 ...	7 16 S. ...	,, 29,	1 0	*m*
T Vulpeculæ ...	20 46·8 ...	27 50 N. ...	,, 30,	22 0	*m*

M signifies maximum; *m* minimum.

Meteor-Showers.

	R.A.	Decl.	
	°	°	
From Pisces	6 ...	11 N. ...	Swift.
Near β Trianguli	30 ...	36 N.	
,, α Camelopardalis ...	70 ...	65 N. ...	Swift; streaks.
,, δ Cephei	336 ...	57 N. ...	Swift.

GEOLOGY IN RUSSIA.[1]

THE Geological Committee of St. Petersburg has made an important contribution to Russian geology by bringing out a new sheet of the Geological Map of Russia, covering the Southern Urals.[2] A volume of explanatory text accompanies the map. It appears from the recent explorations of the members of the Committee that, contrary to the current opinion as to the Southern Urals consisting of a number of chains radiating from Mount Yurma, the great chain consists in its southern parts of a number of chains parallel to one another, and all running from the south-west to the north-east. The main water-parting is built up of granites, syenites, and gneisses, considerably worn down by denuding forces; it has a steep slope towards the east, where its base disappears beneath the Tertiary deposits, while towards the west it is over-

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[1] *Memoirs* (vols. ii. and iii.) and *Izvestia* (vols. iv. and v.) of the Russian Geological Committee.

[2] "Carte géologique générale de la Russie," Feuille 139; "Description orographique," by A. Karpinsky and Th. Tchernysheff; "Hauteurs absolues de l'Oural méridional," by A. Tillo; and "Explication de la Carte," by A. Karpinsky and Th. Tchernysheff, in *Memoirs*, vol iii. No. 2. (In Russian, with summaries in French.)